THE EFFECT OF SCHOOL STARTING AGE, PARENT EDUCATION, AND GENDER ON HIGH SCHOOL ACADEMIC ACHIEVEMENT AND EXTRACURRICULAR PARTICIPATION

A Field Study

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A STUDY ON SCHOOL STARTING AGE, PARENT EDUCATION, AND GENDER ON HIGH SCHOOL ACADEMIC ACHIEVEMENT AND EXTRACURRICULAR PARTICIPATION

An Abstract of a Field Report by
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August 1989
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The problem. Is there a long-term effect of starting age on academic achievement, participation in athletics, student government and organizations, and fine arts, and the continuation of post-secondary education?

Procedure. The graduates of a small rural high school over a five-year period made up the study sample. The students were first divided by the age at which they entered kindergarten into an older and younger group. The older group turned six before March of their kindergarten year. Records were examined and assistance was received through survey information concerning the number of activities each student participated in, standardized test scores, grade point average, and parental education levels.

Findings. No significant effect was found in student participation, academic achievement, or post-secondary education, due to school starting age.

Conclusions. The age at which a student begins school is not, in itself, a significant factor at the high school level on any aspect of the student's success or participation.

Recommendations. There was a slight indication that age, gender, and parent education, when considered together, may have an effect on ACT performance. This could be interesting to investigate further with a larger sample group.

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CHAPTER 1

Introduction

Is there a relationship between the age students start school and their success in high school in terms of participation and academic success?

Identification of the Problem

School starting age has been the interest of researchers for many years. As the working roles of mothers change, more interest is given to starting students at even earlier ages in formal education. There have been many reports on the short term effect of starting age in relationship to elementary grade performance, but little consideration has been given to the long term effects. In this study the participation in extracurricular activities in high school, academic achievement in high school, and post-high school education will be examined in relation to school starting age.

Significance of the Study

The study of school starting age and the variables leading to the greatest level of school success may be applied to practices determining when students begin their formal education. If there is a significant effect on the achievement and participation of students who

begin school at a certain age, it could be addressed by school districts in determining placement of in-coming kindergarteners.

This information could also be useful to parents wanting to make decisions different from local or state guidelines on the starting date for their child's formal education. With this information, they will have one more item to consider when placing their child in school in hopes of achieving the greatest success for them.

CHAPTER 2

Review of Literature

School starting age has been a topic in literature since the 1920s. Many views have been considered, but no solid answers to the question have been found. Because of the continued question--and now in some areas the beginning of even earlier formal education--the search for a solution continues. The basic problem of school starting age is stated by Kinard and Reinherz (1986) as a concern that children who are cognitively or emotionally immature may be at risk in facing persistent failure or maladjustment.

In reviewing the literature, some studies are concerned with performance and adjustment only in the elementary grades (Kinard & Reinherz, 1986; Uphoff & Gilmore, 1986; Campbell, 1985; Obrzut, Nelson, & Obrzut, 1984). In these studies, findings and recommendations vary according to the variables considered. Kinard and Reinherz (1986) found that in considering information processing skills at school entry, the youngest group scored the lowest and the oldest group scored the highest. But by fourth grade, age was not a factor of significance. However, they found that girls scored higher in language and boys scored higher in math. It was concluded that cognitive and emotional readiness was a major factor in school success. Langer, Kalk, and

Searls (1984) also concluded that achievement differences due to age, decrease with time spent in school. Their study found the differences to have diminished by the age of thirteen for white students, but not for black students. At the age of seventeen they found there was no difference for either black or white students based on age. Obrzut, Nelson, and Obrzut (1984) found that early admitted students performed better academically but poorer in social-emotional development.

Some studies measure a child's school success in terms of grade level promotion. Uphoff and Gilmore (1986) said younger children are far more likely to have failed a grade. Uphoff had found 75 percent of retentions in a Nebraska school were summer children. The younger children were found to be off-task two to three times as much as the older and middle aged children. Campbell (1985) found 23.9 percent of younger students were retained and only 6.8 percent of older students, in a study of 457 students in Virginia. Research in a Colorado district (Obrzut, Nelson, & Obrzut, 1984) found 28 percent of the early group versus 2 percent of the older children were retained. This research also identified age related social reasons for retentions, such as short attention span and the need for one on one attention. It was found by Langer, Kalk, and Searls (1984) that the retention rate for young males was

double that for females. Baer (1958) found after eleven years of education, overage students had been more successful in maintaining regular grade promotion. It has been stated that 20 to 30 percent of students, face failure due to overplacement, and the educational system should be charged with the task of correctly placing these students (Johnson & Johnson, 1982). According to some researchers, retention is a questionable measure of school success because teachers are less willing to hold back older students--even when they are performing at a level equal to or lower than that at which a younger student is held back.

At the opposite end of retention, it was found that significantly more gifted fifth through eighth graders had entered school at the age of at least five by September 1 (Maddux, Stacy, & Scott, 1981). In this same line of research, Uphoff and Gilmore (1986) found that 71 to 79 percent of overage summer children in grades three through six, scored above average on the Iowa Test of Basic Skills, while only 22 to 27 percent of at-age summer children scored above average. They also found that on classroom performance 81 to 100 percent of the overage students were graded above average, while only 47 to 60 percent of the at-age summer children scored above average.

Referrals for learning disabilities and counseling services is another area studied in relation to school starting age. DiPasquale, Moule, and Flewelling (1980) found that the number of referrals increased as the age of students in a grade level decreased; this was much more noticeable in male referrals. They found the correlation to age to be greater in academic rather than behavioral referrals. In later grades, the birthdate effect for academic problems was not apparent, but was possibly accounted for by repetition or remediation of the younger students. It was also found by Uphoff and Gilmore (1986) that younger children had more learning disability referrals and placements. They found academic problems of developmentally unready younger children often last throughout the school career. Maddux (1980) found children labeled as learning disabled tended to have entered first grade early and that the high number of "young" learning disabled children persisted through the ninth grade. Drabman, Tarnowski, and Kelly (1987) found the youngest class members to be referred most often for both academic and behavior difficulties throughout all grades. They speculated in their findings, that teacher expectations play a role in the age bias.

Few studies have dealt with students in the high school grades. Baer (1958) followed students through

eleven years and found at eighth grade there was not a significant difference in academic scores, but in high school the overage group made significantly higher grades. The older students also ranked higher on personal traits when ranked by teachers. This is contradictory to Langer, Kalk, and Searls (1984) who found age advantages through the age of thirteen, but significance disappeared by the age of seventeen. Uphoff and Gilmore (1986) found in eleventh grade honor English students 71 percent of the older and 14 percent of the younger students received A's. Although the younger students were honor students, they lacked the self-motivation and maturity to complete "A" work.

Not all studies found a variation in results due to starting age. One hundred and seventeen students were followed through fourth grade and no significant variance was found due to age (Dietz & Wilson, 1985). In a statewide study in Kentucky (Davis, Trimble, & Vincent, 1980), 27 to 34 percent of all children in a given grade were studied. In this study, it was found that by eighth grade there was no significant difference in math and language arts scores between older and younger students, but in reading, a significant difference was found.

Spillman and Lutz (1985) found no areas of significance based on age, but did find that girls did significantly better than boys in all areas except visual memory. Sweetland and DeSimone (1987) found that starting age had an effect only for summer birthdays. The summer children achieved at significantly lower levels through fourth grade, but by sixth grade the effect was less clear. May and Welch (1986) found that by fourth grade there were neither age nor gender differences in performance.

Going to the other extreme in age differences, some studies dealt with children entering school before reaching required age guidelines. It was found that unscreened early entrants accounted for 77 percent of retentions (Braymen & Piersel, 1987). When screening was used carefully it was determined that bright, young entrants excelled in all areas of performance, participation, and teacher ratings (Proctor, Black, & Feldhusen, 1986).

A general conclusion of the reseach showed that unless our education system is willing to accomodate the age difference by having multiple school starting dates during the year, there is no way to avoid a year difference in developmental and cognitive abilities of students in a given class. Other items of readiness

should be considered, as it has been shown that appropriately screened underage students can be just as successful as overage students in their academic careers. The whole concept of development needs to be considered with intelligence and chronological age.

CHAPTER 3

Design of the Study

Null Hypotheses

1. The age at which a child begins kindergarten has no effect on grade point average (GPA) upon high school graduation.

2. The age at which a child begins kindergarten has no effect on performance on the ACT test.

3. The age at which a child begins kindergarten has no effect on post-secondary education (PSE).

4. The age at which a child begins kindergarten has no effect of their total extra-curricular activity (TECA) participation in high school.

Sub-Hypotheses Under Hypothesis 4

1. The age at which a child begins kindergarten has no effect on athletic participation in high school.

2. The age at which a child begins kindergarten has no effect on fine arts participation in high school.

3. The age at which a child begins kindergarten has no effect on other extra-curricular activity (OECA) participation (clubs, organizations, and politics) in high school.

Independent and Dependent Variables

In this research the effect of school starting age (the independent variable) will be examined with the moderator variables of student gender and parent

education. School starting age is the variable of main interest in this study. Gender was included as a moderating variable as it has been shown to play a role in school success in other studies. Parent education was not mentioned in the other research that was examined, but it was chosen to be examined because of biases mentioned by teachers in the studied districts, when discussing student performance. These variables will be considered in this ex post facto study.

There are seven dependent variables that will be researched: grade point average at graduation, ACT score, post-secondary education, total extra-curricular participation, athletic participation, fine arts participation, and other extra-curricular participation. In the research the effect of the independent variable and moderator variables on these dependent variables collectively and individually will be researched.

Research Design

This is an ex post facto study of seventy-one graduates from a five-year period. These graduates were divided into two groups. Group one has the characteristic of being five years old when entering kindergarten, and not turning six before March 15 of their kindergarten year. Group two has the characteristic of being six years old before March 15 during their kindergarten year.

The following schematic illustrates the research design.

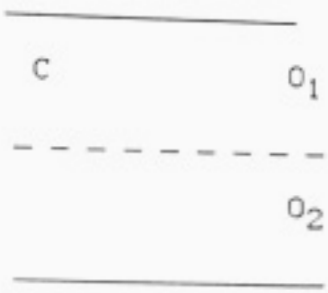

Figure 1. Schematic for research design.

The criterion of age is represented by "C." One group of students has the criterion of being in the younger group at the time of entering kindergarten; the older group does not have the criterion. Therefore, O_1 represents the observation in group one on the dependent variable, and O_2 represents the observation in group two on the dependent variable.

Sampling Design

Twenty percent of the graduates for five consecutive years were chosen at random from the Beaman-Conrad-Liscomb and Union-Whitten Community School Districts. These graduates were divided in the study by the independent variable of school starting age, with parent education and gender used as moderating variables. The effects of these independent and moderating variables were considered individually and collectively on the dependent variables of cumulative grade point average,

ACT scores, post-secondary education, and total extracurricular participation (athletic participation, fine-arts participation, and other extracurricular participation). In this study, the areas of athletics, fine arts, and other extracurricular participation were looked at individually as well as by combining all three areas.

Population

The students in the study came from two combined rural school districts. The district area is composed of five small communities ranging in population from 200 to 1,000, and including the rural areas surrounding the towns. The economy is agriculturally-based. The area is located 20 miles from a medium-sized city (population 25,000) and 50 to 65 miles from two metropolitan areas (populations over 100,000). The income of the area would place most of the population in the middle to upper-middle class. Both districts are 100 percent Caucasian.

The statistics used in the survey were a compilation of the students activities and grades over a four-year high school experience. The grade point average is based on a four-point scale.

Limitations

The study may be affected by the selection process of students for the study. The students were selected at

random, but they were not randomly assigned to the two age groups. Random assignment to the defined age groups was clearly infeasible for the study.

The study may also be affected by the accuracy of the records on file for each student. Some of the participation records were filled out by students at graduation. To double check on this accuracy, coaches and sponsors were requested to fill out a form on each student, but part of this came from memory as well as coaching records. As an additional check, yearbooks were checked for student participation. Little discrepancy was found between sources and this was traced back to students beginning but not completing an activity. Nevertheless, there is the possibility of some human error in the record keeping.

There was some experimental mortality of the subjects in some statistical analyses as not all students had taken the ACT test. The effect of this was minimized by running statistical analyses using the ACT information separately from the other analyses.

Assumptions

In completing the study it will be assumed that grading between teachers is comparable so that the grade point averages are based on the same grade input.

It will be assumed that all records of the student were accurate and complete.

Instrumentation

In the study the ACT was the only standardized instrument used. The ACT was chosen because its reliability and validity have been well-established by the publisher of the test and the majority of the students in the district take this test.

The GPA was used, because this is a universal measure used to describe student academic achievement. Whenever grade point average is used, the assumption is being made that it is comparable from school to school, and individual to individual. For the most part all students taking a specific course would have had the same teacher in their district, but with the two districts there were two separate high schools with individual staffs for part of the years covered in the study. Therefore, the assumption was made that two teachers of the same courses graded similarly for the grade point averages to be comparable. Both districts use the four-point scale for GPA.

Athletic participation was measured by counting the seasons of participation during the grades nine through twelve. Junior varsity as well as varsity participation in athletics was counted. In athletics, managers, statisticians, and cheerleaders were included.

Fine arts participation was measured in terms of semesters of participation for those activities that

matched the school year. Participation in a speech or drama event was considered equal to a semester activity such as participation in a music group.

Other extracurricular activity (OECA) participation was measured in years of membership in clubs and activities based on the school year. Student government was also included in this area.

For total extracurricular activity (TECA) participation, the count for season athletic participation, semester fine arts participation, and year other extracurricular participation were combined into one figure. The amount of calendar time is not equal in getting a unit of count for the different areas, but the clock hours devoted to the various activities is more comparable by using this method of weighting.

Post-secondary education (PSE) was determined by the level of schooling that was obtained after high school graduation. This was a categorical placement in one of three groups: (1) work or military entrance, (2) attendance at a two-year college or vocational school, (3) attendance at a four-year college or university.

Data Collection

In order to collect the data, cumulative folders were reviewed for the seventy-one selected participants. From the cumulative folders the information was found for the date of birth and date of starting kindergarten.

This information was used to calculate their age and to group them according to school starting age. Students were divided into "young" and "old" groups based on when they turned six. Those who turned six by March 15 of their kindergarten year were considered in the older group. This date was selected as it is six months, half a year, after the deadline to turn five for kindergarten entry in Iowa. Those turning six after March 15, were in the younger group.

Also from the cumulative folders, the information for gender, cumulative grade point average, and ACT scores was obtained. Only fifty-four of the selected students had taken the ACT test.

In one district, the extracurricular information was located in the cumulative folders. In the other district, the extracurricular information was located in the files of the activities director. To verify extracurricular information, a survey was sent to all coaches and sponsors who had been in charge of the activities during the individual student's enrollment during school. For students who were in activities where the coach or sponsor was not still employed in the district, yearbooks were examined to double check for participation. The surveys and yearbook examination were intended to find students who listed activities they did not participate in, as well as students who had forgotten

to list participation in activities. Errors were found on the records of three students, all being participation they had failed to record.

For some students, parent education was recorded on the cumulative folders. To gain this information on students where it was not listed, and to update it on those where it was listed, a retired teacher in the Union-Whitten district, and a secretary in the Beaman-Conrad-Liscomb district helped contact the parents and ask for this information. Because of the size of the districts and personal contacts with many of the parents, education level was not verified in all cases by personal contact. If either parent or a residing stepparent had a college degree, they were placed in one group. If no parent in the immediate household held a degree, they were placed in the other group.

Data Analysis

The data analysis began with the construction of exploratory plots. Multivariate analysis of variance (MANOVA) was run on the four dependent variables simultaneously. Univariate analysis of variance (ANOVA) was run on each of the four dependent variables individually. In addition, t tests, and an approximate Z test (Veale, 1988) were conducted to test the sub-hypotheses.

Definition of Terms

The following terms are relevant to this study:

School starting age - variable consisting of the catagories (1) those students who are six before March 15, the year they are in kindergarten, and (2) those students who turn six on March 15 or after during their kindergarten enrollment.

Grade point average - the scale resulting from the conversion of all letter grades in courses taken in grades nine through twelve to numerical values (0-4) and averaging them. (Failing grades are not erased by later successful completion.)

Parent education - variable consisting of the catagories (1) a parent or guardian in the immediate household with a four-year college degree and (2) no parent or guardian in the household having earned a four-year college degree.

Athletic participation - completion of a full season of a sport, including cheerleading, managing, and serving as statistician. The sports include baseball, softball, football, volleyball, wrestling, basketball, track, golf, and tennis.

Fine arts - completion of a semester of band and related small groups, vocal and related small groups, or participation in musicals, plays, yearbook staff, and speech contest participation.

Other extra-curricular participation - includes class offices, student council membership, or membership in any school sponsored club or organization.

Post-secondary education - variable consisting of the catorgories (1) no further education or entering the military service, (2) further education at a two-year college or a vocational school, (3) further education at a four-year college or university.

CHAPTER 4

Analysis of the Data

Review of Hypotheses

In this study there are four main hypotheses that were examined:

1. There is no overall (mean or median) difference in the grade point average (GPA) of graduating high school seniors between those students who started kindergarten under the age of five years, six months, and those who started kindergarten over the age of five years, six months.

2. There is no overall difference in the ACT scores of those high school students who started kindergarten under the age of five years, six months and those who started kindergarten over the age of five years, six months.

3. There is no overall difference in the post secondary education (PSE) of those students who started kindergarten under the age of five years, six months and those who started kindergarten over the age of five years, six months.

4. There is no overall difference in the total high school extracurricular activity participation (TECA) of those students who started kindergarten under the age of five years, six months, and those who started kindergarten over the age of five years, six months.

Three sub-hypotheses were considered under the main hypothesis four, involving total extracurricular activities.

1. There is no overall difference on the total high school athletic participation of those students who started kindergarten under the age of five years, six months and those who started kindergarten over the age of five years, six months.

2. There is no overall difference on the total high school fine arts participation of those students who started kindergarten under the age of five years, six months and those who started kindergarten over the age of five years, six months.

3. There is no overall difference on the total club and organization participation of those students who started kindergarten under the age of five years, six months and those who started kindergarten over the age of five years, six months.

Data Analysis

The following data analysis was completed on the Digital Equipment Corporation VAX 8600 at Drake University using the Statistical Package for the Social Sciences (SPSSX).

Box plots were obtained for each of the dependent variables. At the bottom of each of the following box plots age, gender, and parent education are coded. With

age, 0 is the younger group; 1 is the older group. Males are indicated by a 0 and females by a 1. If no parent or residing stepparent has a college degree, this is indicated with a 1. If a parent or residing stepparent has a four-year college degree this is indicated with a 2. (This variable, parent education, is denoted "PARENTED" in the box plots.)

With the ACT scores there was only one extreme outlier. This was an older female with parents with high education levels. Her ACT score, however, was consistent with her GPA performance. In all other cases, the ACT scores were within the expected ranges.

Figure 2. Box plots for the variable, ACT scores.

In the GPA box plots one extreme outlier was found with an older female with low parent education.

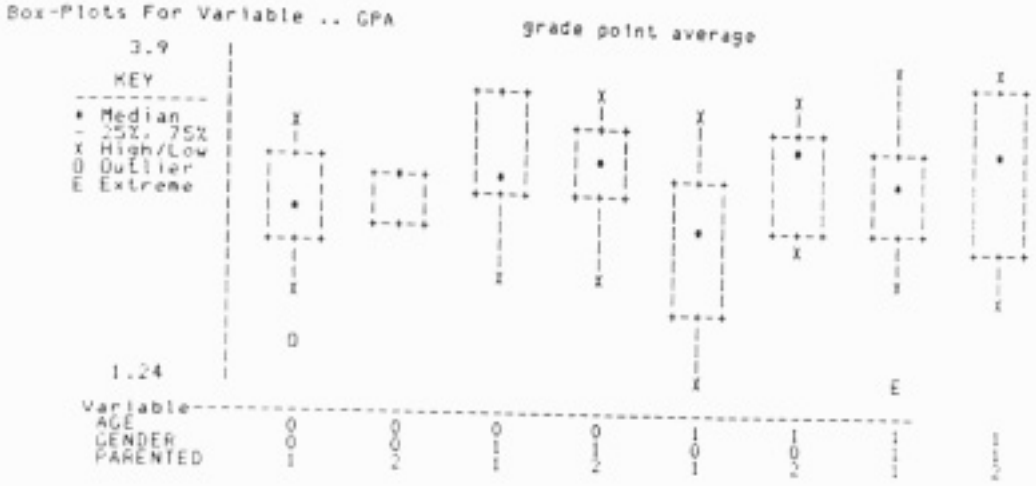

Figure 3. Box plots for the variable, grade point averages.

In the TECA box plots there were two extreme outliers on the high side of participation. These both were older boys. One had low parent education with 34 units of participation. The other had high parent education with thirty-six units of participation. Their units of participation were far above that of the other older boys in the study.

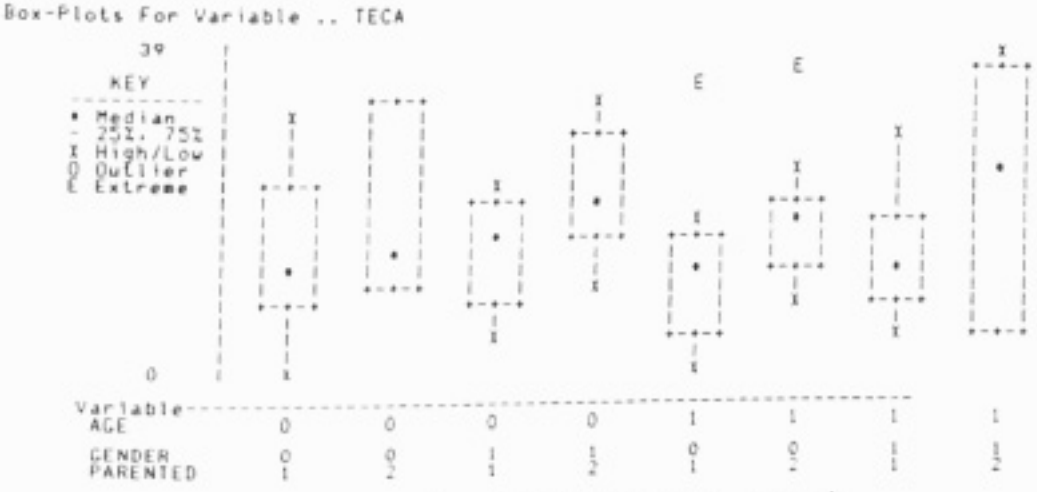

Figure 4. Box plots for the variable, total extra-curricular activities.

In the post-secondary education box plots there were two older boys with high parent education that went to two-year colleges rather than four-year. Since the other eight older boys had gone on to four-year colleges, these two did not meet the statistical expectations. In the computer printout, PSE had originally been termed AFTERSCH.

Figure 5. Box plots for the variable, post-secondary education.

The Box M test for homogeneity of dispersion matrices yielded nonsignificance [M=80.817, p=.620(approx.)]. Thus the assumption of homogeneous dispersion matrices appears tenable.

The Bartlett-Box F test and Cochran's C test for univariate homogeneity of variance were conducted to analyze the variances of ACT performance, grade point average, total extra-curricular activity participation, and post-secondary education over the various subgroups.

Table 1. Homogeneity of Variance: Bartlett-Box Statistics

Dependent Variable	Bartlett-Box F	P-Value
ACT	0.688	0.682
GPA	0.798	0.589
TECA	0.982	0.442
PSE	-----	-----[a]

[a] Cannot be done since one cell had zero variance.

Table 2. Homogeneity of Variance: Cochrans Statistics

Dependent Variable	Cochrans C	P-Value[a]
ACT	0.277	0.214
GPA	0.210	0.681
TECA	0.270	0.142
PSE	0.238	0.342

[a] P-Value for Cochrans C is approximate.

Results of the preceding tests indicate that the variances are homogeneous when each dependent variable is considered independently. Homogeneity of variance is thus a tenable assumption.

The plots of residuals versus predicted values, indicate graphically the results of homogeneity of variance discussed in the preceding paragraph. (See Figures 6, 8, 10, and 12.) The normal plots indicate normality as evidenced by the straight line relationship shown in the figure. (See Figures 7, 9, 11, and 13.)

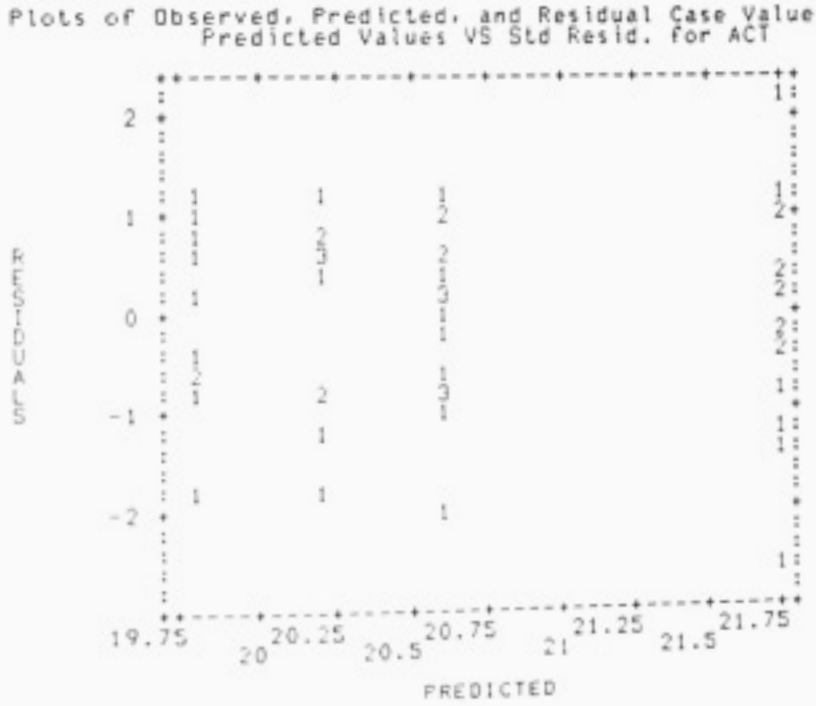

Figure 6. Plot of residuals versus predicted values for ACT scores.

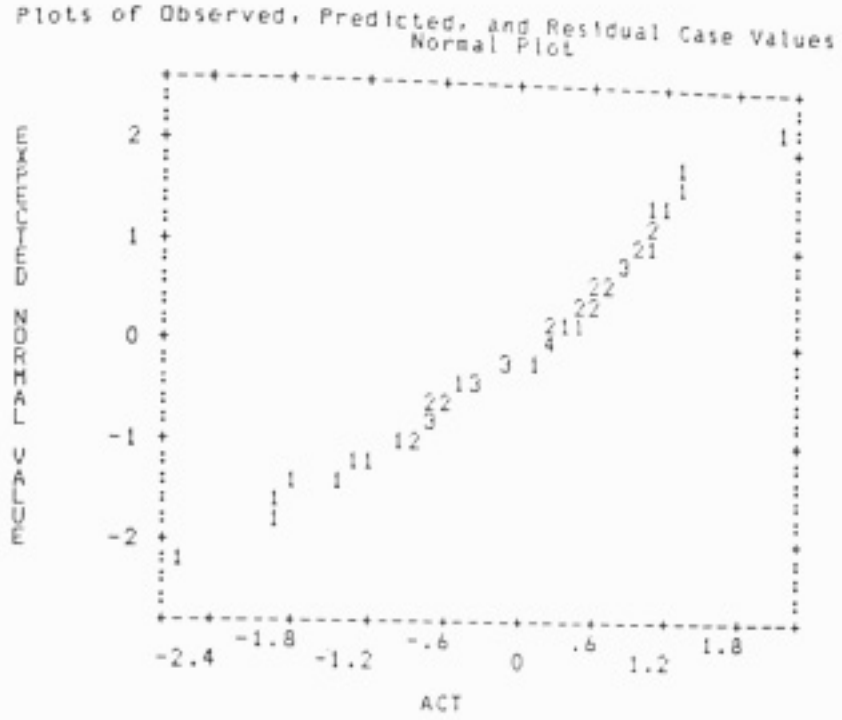

Figure 7. Normal probability plot of residuals for ACT scores.

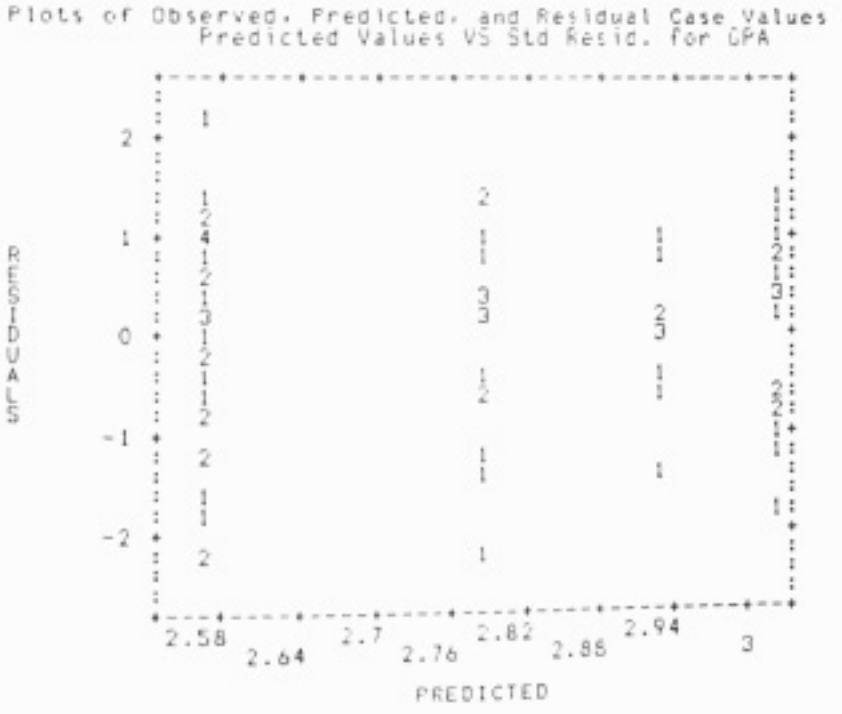

Figure 8. Plot of residuals versus predicted values for GPA.

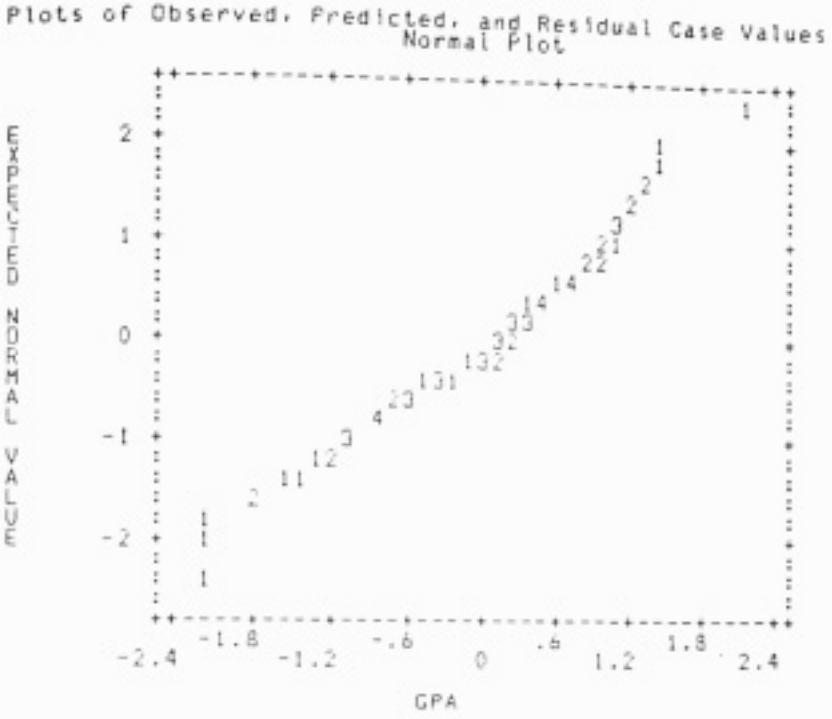

Figure 9. Normal probability plot of residuals for GPA.

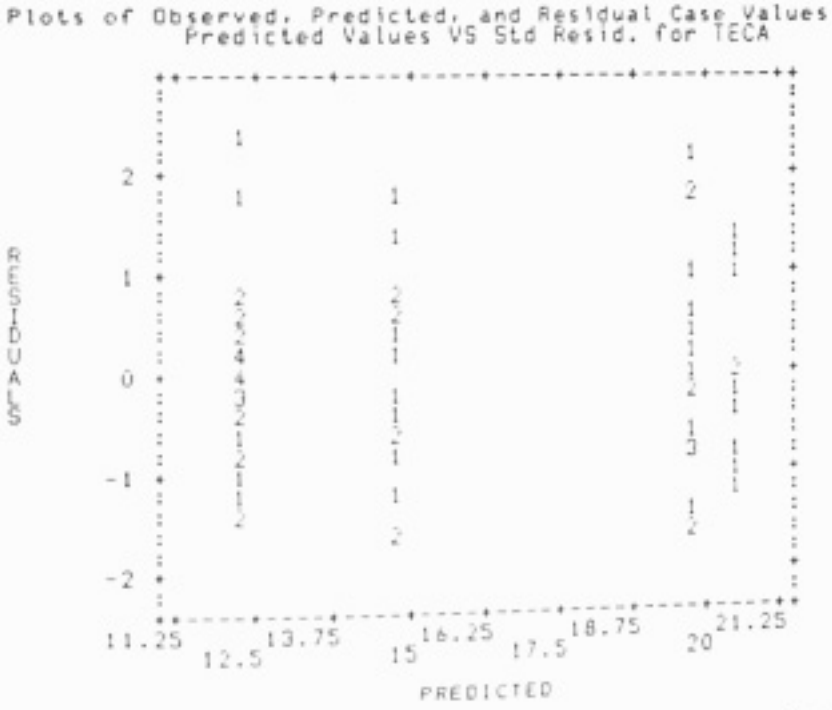

Figure 10. Plot of residuals versus predicted values for TECA participation.

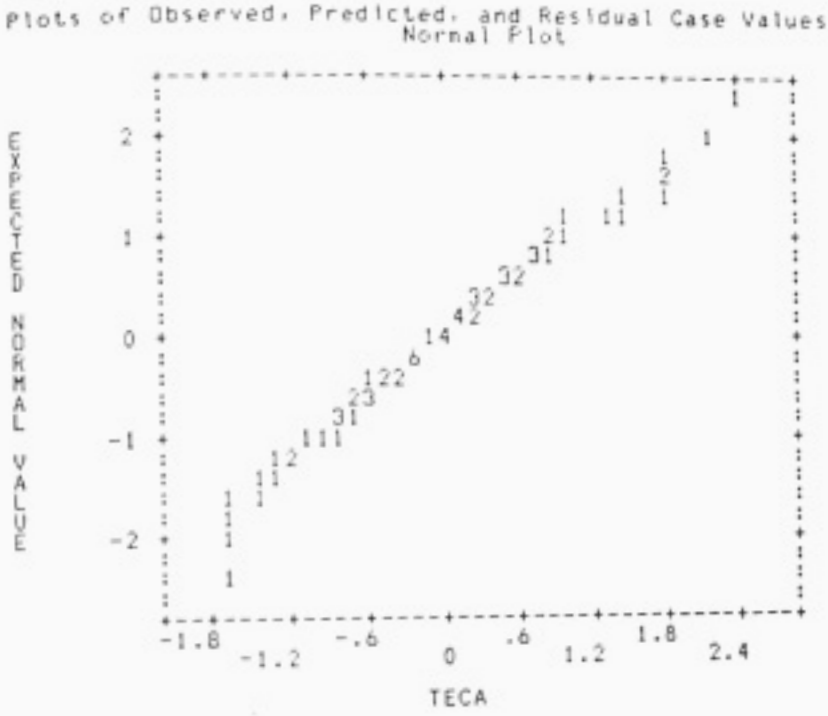

Figure 11. Normal probability plot of residuals for TECA participation.

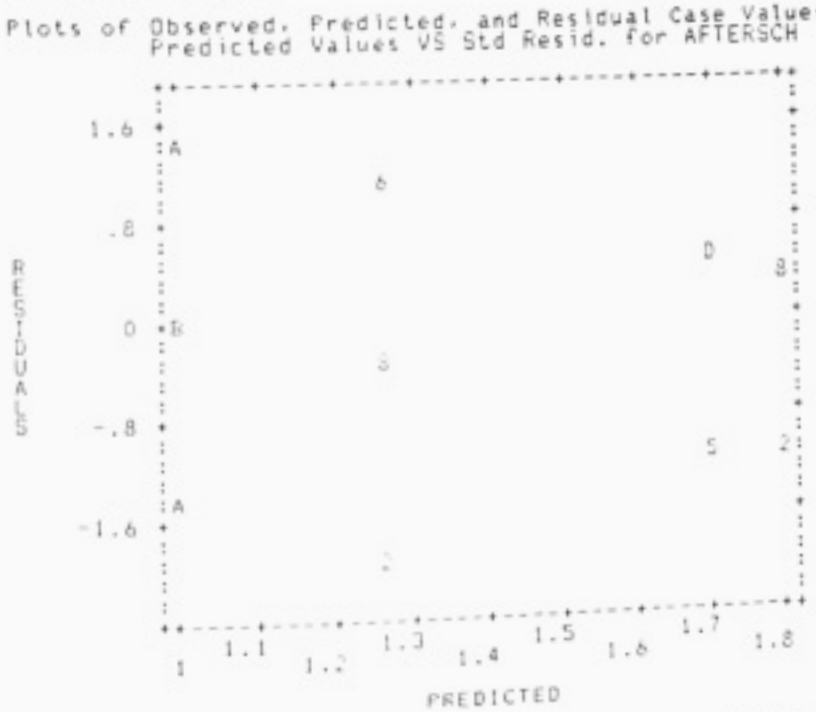

Figure 12. Plot of residuals versus predicted values for PSE. (Note: A=9, B=10, C=11, D=12, and so on.)

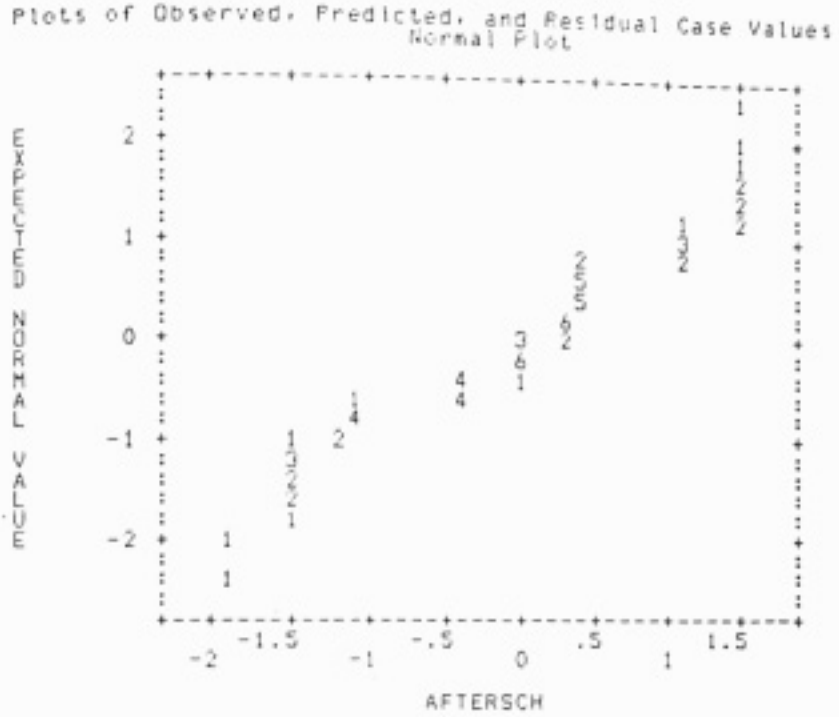

Figure 13. Normal probability plot of residuals for PSE.

Multivariate analysis of variance (MANOVA) was conducted in the following configurations: (1) GPA, (2) ACT, (3) TECA, and (4) PSE, all analyzed by age, gender, and parent education.

Table 3. Test Statistics and P-Values for the Table for the Multivariate Analysis of Variance[a]

Variable	Wilks Lambda	P-Value[a]
Age	0.982	0.936
Gender	0.918	0.438
Parent Education	0.867	0.178
Age by Gender	0.951	0.695
Age by Parent Education	0.980	0.928
Gender by Parent Education	0.931	0.537
Age by Gender by Parent Education	0.870	0.189

[a] All four dependent variables (ACT, GPA, TECA, and PSE) were used in MANOVA.

None of the effects of the MANOVA were statistically significant. The MANOVA used listwise deletion of missing data. This resulted in only fifty-four of the seventy-one cases being used in this analysis due to the seventeen students who did not take the ACT.

For further analysis of the complete data (seventy-one cases) univariate analysis of variance (ANOVA), was conducted on the VAX using SPSSX. Since these analyses were conducted on one dependent variable at a time, there was no deletion of data due to the missing ACT scores.

Table 4. Test Statistics and P-Values for the Analysis of Variance: Dependent Variable ACT

Variable	F-ratio	P-Value
Age	0.183	0.671
Gender	0.373	0.544
Parent Education	0.395	0.533
Age by Gender	0.251	0.619
Age by Parent Education	0.062	0.804
Gender by Parent Education	0.997	0.323
Age by Gender by Parent Education	2.012	0.163

Note: When doing univariate analysis the ACT has fewer degrees of freedom for the error term due to missing subjects.

The only interaction with age which was in the ballpark of statistical significance was the age, gender, parent education interaction ($p=0.163$) in Table 4.

Table 5. Test Statistics and P-Values for the Analysis of Variance: Dependent Variable Grade Point Average

Variable	F-ratio	P-Value
Age	0.033	0.857
Gender	1.909	0.172
Parent Education	2.163	0.146
Age by Gender	0.137	0.712
Age by Parent Education	1.041	0.312
Gender by Parent Education	0.555	0.459
Age by Gender by Parent Education	0.043	0.836

Table 6. Test Statistics and P-Values for the Analysis of Variance: Dependent Variable Total Extracurricular Activities

Variable	F-ratio	P-Value
Age	0.215	0.645
Gender	0.556	0.458
Parent Education	6.642	0.012
Age by Gender	0.059	0.809
Age by Parent Education	0.183	0.670
Gender by Parent Education	0.083	0.774
Age by Gender by Parent Education	0.001	0.975

Table 7. Test Statistics and P-Values for the Analysis of Variance: Dependent Variable Post-Secondary Education

Variable	F-ratio	P-Value
Age	1.482	0.228
Gender	0.074	0.787
Parent Education	12.331	0.001
Age by Gender	0.129	0.721
Age by Parent Education	0.074	0.787
Gender by Parent Education	1.316	0.256
Age by Gender by Parent Education	0.267	0.607

From the ANOVA analysis of data the only variable that had any significant effect was Parent Education. Parent education significantly affected the level of post secondary education (F=12.331, p=0.001) and the number of extra-curricular activities in which they participated (F=6.642, p=0.012). Those students with parents with post-secondary degrees were most likely to go to four year colleges themselves (see Table 8). These same students were also more active in terms of total extracurricular activity participation. The only other effect that was close to statistical significance at the .10 level was the effect of parent education on GPA (F=2.163, p=.146).

Table 8. Summary Table of Group Means

	ACT	GPA	TECA	PSE
Age Group				
Young	20.000	2.838	16.923	1.462
Old	21.152	2.738	15.111	1.267
Gender				
Male	21.036	2.655	14.575	1.300
Female	20.346	2.928	17.323	1.387
Parent Ed.				
No Degree	20.429	2.646	13.227	1.091
Degree	21.000	2.984	19.926	1.741

In examining the group means for the independent variable and the two moderating variables, the area of parent education showed the greatest difference in means. This is consistent with the other results that were found in the study. In all four areas (ACT, GPA, TECA, and PSE), the means for the group of students coming from homes with at least one parent with a four-year degree were consistently higher.

In regard to age, which was the independent variable in the study, there was a tendency for the younger students to have higher means in the areas of GPA, TECA,

and PSE, but the older students did have a higher ACT mean. However, none of these differences were statistically significant.

In the gender area, males had a higher ACT mean, but the females had higher means in the other three areas (GPA, TECA, and PSE). It should be kept in mind that the ACT means were based only on fifty-four of the seventy-one cases where the other means were based on the entire sample of seventy-one. However, none of these differences were statistically significant.

Results from the t tests, comparing older and younger students' mean participation in athletics and mean participation in fine arts are presented in Tables 9, 10, and 11.

Table 9. T-Test for Fine Arts Participation by Age

Group	N	Mean	SD	T-Value	P-Value
Young	45	6.822	7.171		
				-0.24	0.814
Old	26	7.231	6.796		

Table 10. T-Test for Athletics Participation by Age

Group	N	Mean	SD	T-Value	P-Value
Young	45	7.178	4.633		
				-0.85	0.398
Old	26	8.154	4.705		

Table 11. Z-Test for Other Extra-Curricular Activity Participation by Age

Group	N	Median	PSD[a]	Z-Value	P-Value
Young	45	1.5	2.22		
				2.45	0.014
Old	26	0.0	1.48		

[a]PSD is the pseudostandard deviation.

The results of the t tests were nonsignificant. The Z test was chosen for the other extra-curricular activities (OECA), because of the outliers that were found upon examination of the box plots. (See Figures 10 and 11.) The Z test for OECA yields a significant difference in the median number of OECA participated in

between the younger and older students, with the younger students having the higher median participation.

In the Z test the median of the older students is zero, since twenty-seven of the forty-five older students were not involved in any clubs or organizations. Yet there were two of these students who were outliers, participating in six and seven organizations. With the younger students, slightly less than half of them were not involved in any clubs or organizations, but there were no outliers. Thus, the practical significance of this result is in doubt.

Figure 14. Box plot for other extracurricular activity participation for the young group.

Figure 15. Box plot for other extracurricular activity participation for the older group.

CHAPTER 5

Conclusions

In completing this study, there were no areas where age was a statistical significant factor in school participation or academic performance. The only area where age approached marginal statistical significance was in combination with gender and parent education on ACT scores. The only factor that did show a statistically significant effect on post-secondary education and extracurricular participation was parent education. Parent education is not a variable that can be altered for individual students. Therefore, this variable cannot be applied "at will" to improve student participation.

Comparison to Current Literature

The results of this research remained consistant with that of other studies. As students were being studied at the completion of high school, they were past the age of seventeen; and according to Langer, Kalk, and Searls (1984) differences in performance have by then disappeared. The research which did show differences at the high school level was examining a specific subject area performance, which was not examined in this study.

The current trends in school starting age are taking into consideration the increasing academic demands on students at consistently younger ages. If this trend to

escalate the curriculum continues through the grades, research directed at age in conjunction with high school performance may be an area to continue to monitor. Uphoff and Gilmore (1986) have shown in an Ohio study that stress on the younger students may be taking a toll as 45 percent of male teenage suicides and 83 percent of female teenage suicides were summer births, while summer births only accounted for 35 percent of the population studied.

There remain a large number of areas to research in related areas to school starting age.

Recommendations

Based on this study, there is no statistical basis for starting a child to school at either the age of five or waiting one year. Parents have been presently making this decision based on their opinions of their child's readiness and personal prejudices about school starting age. It would appear that parents are making appropriate decisions for their own children, since lasting statistical differences are not apparent.

References

Baer, C. J. (1958). The school progress and adjustment of underage and overage students. Journal of Educational Psychology, 49, 17-19.

Braymen, R. K. F., & Piersel, W. C. (1987). The early entrance option - Academic and social/emotional outcomes. Psychology in the Schools, 24, 178-189.

Campbell, S. (1985). Younger kindergarten students experience more failure. The School Administrator, 42, 14-17.

Davis, B. G., Trimble, C. S., & Vincent, D. R. (1980). Does age of entrance affect school achievement? Elementary School Journal, 80, 133-143.

Dietz, C., & Wilson, B. J. (1985). Beginning school age and academic achievement. Psychology in the Schools, 22, 93-94.

DiPasquale, G. W., Moule, A. D., & Flewelling, R. W. (1980). The birthdate effect. Journal of Learning Disabilities, 13, 234-238.

Drabman, R. S., Tarnowski, K. J., & Kelly, P. A. (1987). Are younger classroom children disproportionately referred for childhood academic and behavior problems? Journal of Consulting and Clinical Psychology, 55, 907-909.

Johnson, B., & Johnson, C. (1982). Overplacement: rushing children to failure. USA Today, 110, 52-54.

Kinard, E. M., & Reinherz, H. (1986). Birthdate effects on school performance and adjustment: A longitudinal study. The Journal of Educational Research, 79, 366-371.

Langer, P., Kalk, J. M., & Searls, D. T. (1984). Age and admission trends in achievement: A comparison of blacks and caucasians. American Educational Research Journal, 21, 61-78.

Maddux, C. D. (1980). First-grade entry age in a sample of children labeled learning disabled. Learning Disabilities Quartlerly, 3, 79-83.

Maddux, C. D., Stacy, D., & Scott, M. (1981). School entry age in a group of gifted children. Gifted Child Quarterly, 25, 180-184.

May, D. C., & Welch, E. (1986). Screening for school readiness: The influence of birthdate and sex. Psychology in the Schools, 23, 100-105.

Obrzut, A., Nelson, R. B., & Obrzut, J. E. (1984). Early school entrance for intellectually superior children: An analysis. Psychology in the Schools, 21, 71-77.

Proctor, T. B., Black, K. N., & Feldhusen, J. F. (1986). Early admission of selected children to elementary school: A review of the research literature. The Journal of Educational Research, 80, 70-76.

Spillman, C. V., & Lutz, Jay P. (1985). Criteria for successful experiences in kindergarten. Contemporary Education, 56, 109-113.

Sweetland, J. D., & DeSimone, P. A. (1987). Age of entry, sex, and academic achievement in elementary school children. Psychology in the Schools, 24, 406-412.

Uphoff, J. K., & Gilmore, J. (1986). Pupil age at school entrance - How many are ready for success? Young Children, 41, 11-15.

Veale, J. R. (1988). A primer on statistics and data analysis for educational research. An unpublished manuscript, Des Moines, IA: Graduate School of Education, Drake University.

Appendix A

Sample Letter of Request to Coaches and Sponsors

March 13, 1988

Dear Faculty Member:

I am in the process of writing a research project for my Specialist at Drake. My research is in the area of school success and participation in relation to school entry age.

As a double check on student records of participation, I need some assistance from you. Attached is a listing of students that were chosen at random. The graduating classes of 1984 through 1988 are used in my research. Therefore, because of changes in sharing, the current coach or sponsor may not be aware of participation by students from one of the schools, so please fill out any of the information that you are aware of.

In filling out the forms, please indicate the years of participation, the grade level is not of importance. If a student was a manager or cheerleader for multiple sports please indicate years of participation for each sport.

I know that assisting in surveys like this takes time, and I really appreciate your assistance.

Thank you for your time and help. If you have any questions please call me. I would appreciate the returned surveys by March 22, as I need to concentrate on my paper over break.

Sincerely,

Diane Petty

Appendix B

Form Used to Record Extracurricular Activities

Student Name_____

Softball_____

Baseball_____

Football_____

Volleyball_____

Basketball_____

Track_____

Golf_____

Manager_____

Lettermen's Club_____

Vocal_____

Special Vocal Group_____

Band_____

Special Band Group_____

Play/Musical_____

FFA_____

FHA_____

Student Council_____

Class Officer_____

National Honor Society_____

Cheerleading_____

Wresting_____

Annual Staff_____

Appendix C

Sample Form for Information From Cumulative Folders

Name_____

Birthdate_____

Age of School Entry_____

Any Retentions_____

Age at ACT_____

ACT score_____

Cum. GPA_____

Class Rank_____

Sex_____